Have you ever dreamed of scuba diving in some exotic port in search of sunken pirate treasure?

MacScuba the world's first Scuba Diving Simulator makes the dream into a reality.

ADVENTURE

Explore a shipwreck in search of sunken pirate treasure with gold dubloons, silver pieces of eight, and precious jewels. Meet some of the strangest creatures that inhabit the ocean's depths while fighting off killer tiger and hammerhead sharks. If you stay alive long enough you may collect a king's ransom in treasure and become the world's greatest MacScuba diver.

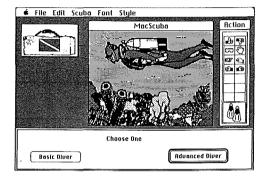
EDUCATIONAL

Experience what it is like to scuba dive the ocean's depths. Learn how to use the U.S. Navy Dive Tables to do multilevel No-Decompression Dives and repetitive Decompression Dives. Become familiar with marine plant and animal life while diving with MacScuba.

REALISTIC

MacScuba completely simulates the underwater environment using Mac's superb graphics and digitized sound, you will think you are there. You have complete control of all aspects of scuba diving from filling your scuba tank to releasing your weight belt in an emergency ascent.

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FUN

Hours of fun for the seasoned diver, or if you have never been in the ocean before. All ages can enjoy MacScuba Dive Simulator, so why not dive in now!

Required equipment:

Macintosh Plus, Macintosh SE, or Macintosh II (minimum 1 megabyte of RAM)

Two 800K floppy-disk drives, or one 800K drive and one hard-disk drive.

MacIntosh is a registered trademark of Apple Computer, Inc.



The Ultimate Simulation For The MacIntosh Computer Paradise Software Corp.

PREFACE

What You Need to Use MacScuba



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MacScuba[™]

A Scuba Diving Simulation For the Macintosh Computer

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> Program by Brian L. Murphy

Paradise Software Corp. P.O. Box 50996 Phoenix, Az. 85076 (602) 893-8324

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Before You Begin ...

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Fill out the enclosed registration card and mail it. Mailing the registration card will protect your warranty and make you a registered user of MacScuba. As a registered user you will be notified of additional upgrades and new releases regarding MacScuba and other Paradise Software programs. Support will not be provided unless this registration card is filled out and returned to Paradise Software Corp.

MacScuba is not copy protected

Use the Finder or any copy utility to make a backup, store in a safe place. Paradise Software believes that you can be trusted not to reproduce in any manner this program for distribution to other parties without express written consent. We feel that the program should be able to be installed on a hard disk to provide easy and fast data transfer.

You Paid for this product, so why let someone else enjoy the benefits of your hard earned cash, and deprive Paradise Software from earning our living by supplying you with great Mac software? Thanks for your cooperation.

Read the Manual

At least read " About MacScuba " page 4.

MacScubaTM

Dive

Simulator

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Paradise Software Corp.

Hardware



What you need to use MacScuba



Memory

MacScuba works in any Apple Macintosh computer with 1 megabyte of memory or more. It works best in systems with a hard disk drive.



Floppy Disk Drive

MacScuba comes on two 800k dual sided floppy disks. You will need a drive for each disk, such as a Mac SE with dual disk drives or MacPlus with one external 800k disk drive as examples.



Hard Disk Drive

MacScuba may be mounted on your Hard drive for added speed during data transfer while the program is running. Follow the instructions below:

INSTALLATION

- 1. Insert Disk 1 into your floppy disk drive.
- Drag the folder marked "Treasure" to your hard disk icon on the Desktop.
- 3. Eject Disk 1
- 4. Insert Disk 2 into your floppy disk drive.
- 6. Open the folder marked "The Sea".
- 7. Copy the entire contents of the folder "The Sea" into the folder "Treasure" on your hard disk.
- 8. Eject Disk 2.

You are now ready to dive MacScuba from your hard disk.

CHAPTER 1

Diving With MacScuba



About MacScub

Have you ever dreamed of scuba diving in some exotic place in search of sunken pirate treasure?

Well Mel Fisher, eat your heart out! MacScuba is here! Now anyone can experience the adventure and excitement of exploring a sunken pirate wreck in search of fabulous wealth and fame.

MacScuba is a real-time scuba dive simulation program. It was designed by divers for people who do not always have the ability to scuba dive as frequently as they may like and people who have a desire to experience the underwater world of scuba diving for the first time.

The author has recreated the total underwater environment and the physical changes to a diver's body and equipment as the forces of nature act upon them. The program completely simulates the effects of nitrogen and pressure on the human body involved in sport diving. The information supplied on marine life will be a benefit to all divers as well as to any person interested in the ocean's marine life. This program is intended to be an enjoyable simulation/game for any person who has scuba dived or not. It will be a fascinating journey for all who undertake it.

IMPORTANT

The author and Paradise Software take no responsibility for any personal injuries to any person while involved in scuba diving or any other activity as a result of using the information contained in this program and its manual. This program and its manual does not pretend to be a learning manual or instruction guide for the sport of scuba or skin diving. The program is based upon the personal knowledge the author has gained from his own experiences in these areas. Furthermore the author and Paradise Software have no affiliation with any of the certification agencies in the United States or world wide other than their own personal diving certifications.

The author and Paradise Software do not condone the use of scuba diving equipment without the proper certification from one of the many excellent training agencies throughout the world. Scuba diving can be a dangerous experience and should not be attempted without the proper training and guidance these agencies provide.

Technical

MacScuba

The formulas used in the computation of decompression in the divers body are the same ones used to construct the U.S. Navy dive tables. These formulas are based upon the work of English physiologist, J.S. Haldane (see Chapter 3 for a more in depth discussion on dive tables and decompression).

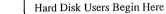
Getting Started

This manual assumes you are familiar with basics of operating a Macintosh computer. If you are not, please consult your user's manual and familiarize yourself with the interface before continuing through this manual.

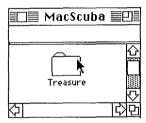
Now that you have been introduced to MacScuba follow these steps to begin the adventure.

Turn the Ram Cache off if you have less than 2 megabytes of Ram.

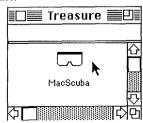
- 1. Insert Disk 1 labeled "Treasure " into drive 1.
 - 2. Insert Disk 2 labeled "The Sea" into drive 2.
 - 3. Open the Disk named " MacScuba ".



4. Open the folder named " Treasure " on disk.



Move the pointer over the application named "MacScuba" and click mouse.





Getting Started (

Paradise Software Presents MacScuba Dive Simulator A message window will appear signaling that you have followed the instructions correctly.

You will next encounter a dialog window with two buttons. Move the pointer over the the button labeled **Basic Diver** and click mouse.



Advanced Diver

Basic Diver

This level will allow you to become familiar with the operation of all the equipment and procedures of scuba diving. You should become acquainted with the dive **Decompression Tables** and their use before advancing to the next level. You will be able to dive to varying depths and choose the length of time between dives. Predator fish will not attack at this level unless provoked, so be careful not to aggravate them. Your dive can still be abruptly over if you do not use discretion when encountering certain marine life.

Advanced Level

At this level you will be able to enter the shipwreck and search for treasure. Your ability to stay underwater for long periods of time will depend upon how much treasure you can accumulate and bring to the surface on each dive. If you bring up the most treasure you will become the world's greatest MacScuba diver and your name will be put in a place of honor.



Locate the **Dive Bag** window, move the pointer over it and click the mouse. This will open the **Diver** window and will allow you to have access to all of the dive equipment.

Treasure Hunting



This activity is for advanced divers only. I cuba allows you to explore an old pirate wreck and search for ... antold wealth of treasure. You are allowed 3 tanks of air to accumulate as much treasure as you can carry. The more treasure you accumulate on each dive will decide how much time you will have between dives. This is very important unless you want to spend a day diving with MacScuba. The time spent on the surface determines the time you are allowed by the dive tables to stay submerged at different depths. Read Chapter 3 "Planning Your Scuba Dives" for more information on this subject.

Locating Treasure

Once you have located the entrance into the wreck you may begin your search. You will have to constantly monitor your gauges and compass so you will know where you are at all times because the ship is a maze of passages and rooms. Once you have located and entered a room you may collect the treasure found in the room in the form of gold, silver, jewels and artifacts.



Collecting Treasure

To collect the treasure activate the **Goodie Bag** in the diver window and the hand icon in the **Action** window. Move the hand over the item you want and press the mouse button. Continue to hold the mouse button down and move the hand over the opening in the **Goodie Bag**. When you release the mouse button the item will be placed in the bag.

Am I Rich Yet?

To find out the total value of the treasure you have collected on the current and previous dives open the **Goodie Bag** and view the **Ships Manifest**. To open the manifest follow the procedure to open the **Goodie Bag** (see pages 10 and 18) then double click the mouse on the same location, the manifest should appear. This document will have the total value for each of the types of treasure you have collected on the current dive and the total of all the treasure you have collected on all of your dives.

Hand Signals

During the dive you may be tested for your knowledge of hand signals and your ability to respond to them correctly. At random times your dive buddy will signal you with one of the common dive signals, you are given three response signals to choose from. An incorrect response will penalize you with a loss of air from your tank.

Technical Support

Should you have a problem using MacScuba you may call our technical support line during normal business hours. We provide unlimited telephone support for our registered users, so be sure to send in the registration card. All that is required is that you pay the telephone charges (do not call collect) for this service. We will be more than happy to assist you in any way possible.

Technical Support: (602) 893-8324

Business Hours: 9:00AM to 4:00PM (Arizona Time)

Monday - Friday

CHAPTER 2

MacScuba Dive Equipment



Diver Window



10

This window allows access to all the diver's equipment.

Operation of Diver

- Move cursor over desired piece of equipment on the diver's body.
- 2. Click mouse once to activate the piece of equipment. The chosen piece will invert color to signal activation.
- 3. Double click mouse to open the piece of equipment selected.

Close Diver Window Move pointer inside the close box in the upper left corner of thewindow and click mouse button

Equipment List:

Dive Console
Mask
Regulator
Octopus
Bouyancy Control Device
Compass

Weight Belt

Scuba Fins
Tank
Dive Light
Knife
Goodie Bag
Diver

DIVER TIP

Preparation:

Tank Filled

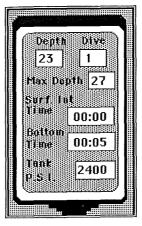
Equipment Inspected

Tank On

Flashlight Checked

Regulator Checked

Dive Console



Mask



The dive console displays all of the vital information you will need while diving. It is your responsibility to md them at all times.

Operation of Dive Console

Hold down mouse button after opening console to continue display. When button is released the window will close.

Dive Displays the current amount of dives you have been on.

Max Depth Displays the maximum depth you have attained in feet on the current dive.

Surf. Int.

Time Displays the time you have spent on the surface since your last dive. It will begin to record the time interval upon ascending above the five foot depth.

Bottom Time Displays the time you have been submerged below the five foot depth on the current dive.

Tank P.S.I. Displays the current pressure in the air tank. The pressure is measured in pounds per square inch (PSI).

The mask dialog controls the clearing of the face glass. From time to time the mask will become fogged and you will have to clear it.

Operation of Mask

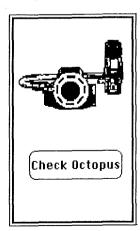
Move the pointer over Clear Mask button and click mouse.

Close Mask Dialog Move the pointer over the picture of mask and click mouse.

Regulator



Octopus



This window controls the regulator. The Octopus consists of two parts, the First and Second stage. The First stage attaches to the scuba tank and lowers the tank pressure to an acceptable level for use by the Second stage. The Second stage is used by the diver to regulate breathing air from the scuba tank.

Operation of Regulator

By checking the regulator before you dive, you are assured of a properly functioning piece of equipment. Move the cursor over the button labeled "Check Regulator" and click the mouse button. If no sound is heard you might want to check the other equipment to see what is causing the malfunction.

Close Regulator Dialog Move pointer over picture of regulator and click mouse.

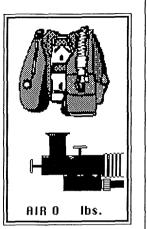
This window controls the Octopus regulator. The Octopus works in the same manner as the Regulator, it being just another **Second** stage. This is a back up piece of equipment for use when your regulator falters.

Operation of Octopus

By checking the Octopus regulator before you dive, you are assured of a properly functioning piece of equipment. Move the cursor over the button labeled "Check Octopus" and click the mouse button. If no sound is heard you might want to check the other equipment to see what is causing the malfunction.

Close Octopus Dialog Move pointer over picture of octopus and click mouse.

Buoyancy Control Device



This window controls the Buoyancy Control vice. This piece of equipment allows the diver to obtain neutral adyancy (stable at a given depth). The strange looking object in the center of the window is a working part of the B.C.D. jacket. It consists of two hoses (see top picture, right hand side of jacket), one connected to the scuba tanks first stage regulator, the other to the inside of the jacket. Both are connected to the valve assembly pictured in the middle of the window. Located on the left side of the picture is the quick release cord and on the back, out of view, is the overinflate release mechanism. At the bottom of the window the AIR 0 lbs. shows the amount of air you have filled the B.C.D. with.

As stated above this piece of equipment allows a diver to be stable at any given depth he desires by inflating or deflating the device.

Operation of B.C.D.

MacScuba

The two methods to inflate and one to deflate are as follows:

1. Using the pointer, place it over the top Power Inflate button and click. The AIR lbs. will increase as long as you hold the mouse button down.

By depressing this valve you are obtaining air from your scuba tank to inflate the B.C.D.. This valve is known as the **Power Inflate** button.

2. Using the pointer, place it over the top left Manual Inflate button and click. This mouthpiece inflates the B.C.D. with the divers own air.

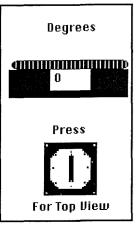
Each time the button is pressed the AIR lbs. will increase a small amount.

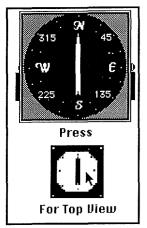
1. Using the pointer, place it over the left Manual Deflate button and click. This valve releases the air from inside the jacket as long as you hold the mouse button down.

The AIR lbs, will decrease as long as the mouse button is depressed.

Close B.C.D. Dialog Move pointer to picture of jacket and click mouse.

Compass





This window controls the compass. The compass is a very important piece of equipment. The constant monitoring of your direction could save your life in an emergency.

Operation of Compass

The top picture is a side view of the compass. The center window in the picture displays the degree you are currently heading. The bottom picture is the face control icon. By clicking the cursor on the face control icon you will activate a graphic display of the face of the compass (bottom left of the page). As long as you hold the mouse button down the face will be displayed. Upon release of the button the display will go away.

Diver Tip

North	0	Degrees
South	180	Degrees
East	90	Degrees
West	270	Degrees

Close Compass Dialog Move pointer over top compass picture and click mouse.

Weight Belt



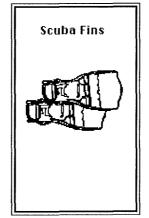
This window controls the operation of the with belt. The weight belt is used to compensate for the diver's back of fat and additional equipment that could make him more buoyant in the water. The belt can be released in emergency situations such as an emergency ascent to the surface.

Operation of Weight Belt

By clicking in the release box the diver's weight will decrease and affect the amount of air needed in his B.C.D. to maintain neutral buoyancy. Once the belt has been released underwater the diver will no longer be able to use the belt until he has returned to the boat.

Close Weight Belt Dialog Place pointer over picture of belt and click mouse.

Scuba Fins



This window controls the operation of the scuba fins. The scuba fins are designed to give maximum thrust through the water.

Operation of Scuba Fins

The fins do not operate in this version of MacScuba.

Close Scuba Fins Dialog Place pointer over picture of fins and click mouse.

Scuba Tank



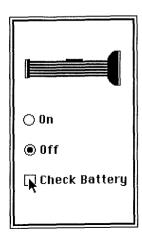
This window controls the scuba tank. The scuba tank consist of a metal cylinder made of aluminum or steel. They can hold in excess of 3000 lbs. of pressure per square inch (P.S.I.). On top of the tank sits a J or K valve used to couple the first stage of a regulator to the tank. In MacScuba we fill our tanks to 2500 P.S.I for our dives. The tank usually is attached to your B.C.D. or a simple back pack.

Operation of Scuba Tank

It is your responsibility to make sure your tank is filled and turned on as shown in the window on the left. Move the pointer over the box next to **Tank On** and click the mouse button. The box will toggle on and off, signaled by the X in the box.

Close Scuba Tank Dialog Place pointer over picture of tank and click mouse.

Dive Light



This window controls the operation of the dive light. This tool has the same purpose as a regular flashlight, only it has been made water proof. It is useful for night dives, cavern, and shipwrecks or any time you would find yourself in the dark under or on top of the water.

Operation of Dive Light

On - Turns light on.

Off - Turns light off.

Check Battery - This could just save your life. Be sure to check it before every dive.

Close Dive Light Dialog Place pointer over picture of light and click mouse.

Dive Knife



This window controls the operation of the state dive knife. The dive knife is an important tool of a diver, it just that save your life. It can be found strapped to the outside of the diver's right leg. The knife is used to signal other divers, but more importantly it can be used to defend the diver from sharks and other dangerous creatures that might be encountered during a scuba dive.

Operation of Scuba Knife

1. Grab Knife

To grab the knife, move the cursor over the handle and click on the mouse, you now have the knife in your hand. The knife will stay in your grasp as long as the mouse button is down. Move the mouse to any location in the scuba mask window and you will see the knife in your grasp. The handle will no longer be pictured in the window until the knife is returned.



2. Knife Stab

To attack a fish just aim the knife and release the mouse button. The divers arm will move in a downward motion until it has reached its limit. If your aim is true you will have successfully defended yourself against the predator.

Close Scuba Knife Dialog Move pointer over picture of the sheath and click mouse.



Goodie Bag



The goodie bag is used by divers to collect items of interest underwater and bring them to the surface. The bag is usually constructed of nylon in the form of netting to allow water to pass through it. The bag is located on the divers hip next to his weight belt. One mouse click will display the bag, two clicks will open the Ship's Manifest.

Operation of Goodie Bag

Grab Item

Once the goodie bag has been opened you may put items you find while diving in the bag. Click on the hand icon in the operate window. Move the hand over the item you want and click the mouse button. Continue to hold the mouse button down and move the hand over the opening in the goodie bag. When you release the mouse button the item will be placed in the bag.

Move Bag

You may move the bag to different locations by moving the pointer over the bag as shown in the window. Click the mouse button without releasing the mouse and move to any location that you desire.

Close Goodie Bag Click any place in diver window.

The Diver window is used to control the breathing equipment and enables the diver to get in and out of the water.

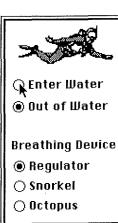
Operation of Diver

The top two switches control getting in and out of the water. You may toggle between the two.

The three lower switches control what device from you are currently breathing from. When the regulator or octopus is chosen you are using air from your scuba tank. The snorkel should be used when extended stays on the surface are necessary. You may toggle between the three as desired. If for any reason your regulator fails you have the advantage of the backup octopus regulator that is identical to the regulator.

Close Diver Dialog Move pointer over picture of diver and click mouse.

Diver



Action Window



The Action window controls most of the non-equipment controls you will use during your dives. Direction, swing, and viewing objects are a few of the functions this window. perates.

Ascend Allows the diver to swim toward the surface when this icon is selected and the Scuba Fins icon is clicked.

Descend Allows the diver to swim toward the bottom when this icon is selected and the Scuba Fins icon is clicked.

View Allows the diver to obtain information on objects underwater. Place mask over item that you would like to view and click mouse. The information will appear in the Dive Log window.

Grab Allows the diver to grab and move items. When the Goodie Bag is displayed diver may put grabbed items in the bag.

Forward Allows the diver to swim forward when this icon is selected and the Scuba Fins icon is clicked.

Operate Allows the diver to operate doors. Click the cursor on the door handle to open and close a door.

Left - Right Allows the diver to change direction when a hand icon is selected and the Scuba Fins icon is chosen.

Scuba Fins Allows the diver to move when a direction icon has been activated, such as Ascend or Left.

Air Pressure

MacScuba simulates the scuba environment including the affects of pressure upon dive equipment and divers. When diving with MacScuba you will notice that you will consume air more rapidly at greater depths. This is due to the greater compression of the air in your scuba tank. As you descend from the surface the compressed air becomes denser or the tank volume decreases in direct proportion to the increase in pressure. The more the air is compressed, the smaller the space it occupies. This is illustrated in the example below.

Diver Tip

ATM: Atmoshere of Pressure 1 ATM = 14.7 PSI

Depth	Pressure	Air Volume				
0 ft.	1 ATM	Full 🖢 🛴				
33 ft.	2 ATM	1/2 Full				
99 ft.	4 ATM	1/4 Full				

This effect is stated in Boyle's Law: "The volume of a gas varies inversely with the absolute pressure while the density varies directly with the absolute pressure provided the temperature remains the same".

The air in your B.C.D. jacket works in a similar manner as you descend. That is why you will have to add more air at greater depths to maintain neutral bouyancy. You will also have to release air as you ascend to the surface to keep the over-inflate mechanism on your B.C.D. jacket from releasing the air as it expands.

CHAPTER 3

Planning Your Scuba Dives



This menu allows access to all the information you will need to plan all of your scuba dives. It has three menu items that allow you to calculate and store the information you need while diving.

Scuba Font Size Type
Dive No-Decompression Tables #N
Dive Decompression Tables #D

Dive Plan #P

The first two menu items will display the two parts of the U.S Navy dive tables in your **Dive Log** window. These tables are used to calculate your decompression times and Group Designation for all of your dives.

The third "Dive Plan" we will discuss now.

Dive Plan

The Dive Plan is a chart for recording all the information from your dives.

Ī		Dive Plan						
	Dive	Depth	Bottom Time	Surface Time				
	1st	100	25:00	4:30				
	2nd							
	3rd							

Operate

Place the mouse over the **Scuba** menu and click mouse. The menu title will change color as shown in the top figure. Hold the mouse button down and move mouse over the **Dive Plan** menu item. Release the mouse button and the **Dive Plan** window will appear. This procedure should be followed for each of the menu items.

Close Window Locate the small box in the top left hand of the window and move the pointer into it. Click the mousebutton and the window will be removed from the screen.

Dive Plan

The information needed to fill the chart can ______ tained from your Dive Console before, during, and after a dive. The Group Designation must be calculated from the dive tables.

Dive	Depth	Bottom Time	Surface Time	Group Designation
1st	80	00:25	4:30	F
2nd				
3rd				

Dive This column lists the dive number you have completed or are currently on.

Depth Your maximum depth.

Bottom Time The total time you have spent underwater on the current dive.

Surface Time The amount of time you have spent on the surface since your last dive.

Group Designation The classification calculated from the dive tables using the information given in columns Depth, Bottom Time and Surface Time.

Example: Dive profile as shown in chart above.

This diver has completed his 1st Dive. The maximum Depth he attained was 80ft. The total time he spent underwater or his Bottom Time was 25 minutes. Since his last dive he has been on the surface or Surface Time for 4 hours and 30 minutes. He has calculated (using the dive tables) that he has become an F Group Designation diver.

Diver Tip

" Plan Your Dive and Dive Your Plan"

Using the No-Decompression Tables

Nitrogen Intake While Diving

The single most important aspect to scuba diving is the quantity of nitrogen absorbed by the diver on every dive. The amount absorbed depends upon the depth and length of time the diver has spent underwater. If the amount of nitrogen in the body reaches a critical number the diver will experience what is known as Nitrogen Narcosis. This effect upon a diver is similiar to being intoxicated and impairs his judgement and skills. During ascent the diver must slowly release this nitrogen through respiration during a series of stops called Decompression Stops. If these stops are not done the diver may form small bubbles in the bloodstream and upon surfacing may experience decompression sickness or what is commonly known as the Bends.

The U.S. Navy dive tables were developed after extensive testing by navy divers to establish guidelines on depth and time a diver may stay underwater before decompression becomes necessary. There are many dive tables in existence designed by various training agencies that are more stringent on **Bottom Time** allowed before a decompression stop must be made for sport diving, but most are based upon these tables. Severe cases of exceeding the decompression limits described in this table may result in paralysis, unconsciousness, or death.

No - Decompression Dive

We will do a dive to 80 feet for 25 minutes.

1. Find the depth you have dived along the left side of the table.

							Dive	Log	
60 70	60 50	10 5	15 10	20 15	25 20	30 30	40 35	50 40	55 45
80 90 100 110	40 30 25 20	5 5 5	10 10 7 5	15 12 10 10	20 15 15 13	25 20 20 15	30 25 22 20	35 30 25	40

Using the No-Decompression Tables

No - Decompression Dive

2. Go across to the figure that denotes your Bottom Time.

						= 1)ive	Loa	
60	60	10	15	20	25	30	40	50	55
70	50	5	10	15	20	30	35	40	45
80	40	 ໍ 5	10	15	20	25	30	35	40
90	30	5	10	12	15	20	25	30	

3. Go up the column to find your Group Designation.

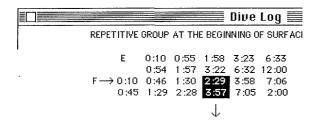
								Dive	Log	
					USN	AVY A	AIR D	ECOMPI	RESSI	ON TAI
NO-DE	COMPRI	ESSIC	M LIMI	TS AN	D REP	ETITIV	E GRO	OUP DES	SIGNA	TION 1
FOR NO	D-DECO	MPRE	SSION	AIR D	IVES					
			ression	!				GR(OUP D	ESIGN
Depth	Limits									
(feet)	(min.)	Α	В	С	D	Ε	F	G	Н	1
							Τ			
10		60	120	210	300					
15		35	70	110	160	225	350			
80	40		5	10	15	20	25	30	35	40
90	30		5	10	12	15	20	25	30	

 Go down to the Repetetive Group table and find your designation group (F).

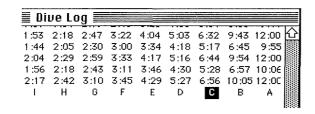
					Dive I	.og 🗮	Ē
REPET	TITIVE C	ROUP	AT THE			SURFAC	-
I	E	0:10	0:55	1:58	3:23	6:33	
		0:54	1:57	3:22	6:32	12:00	
E	0:10	0:46	1:30	2:29	3:58	7:06	
_	0:45	1:29	2:28	3:57	7:05	2:00	

No - Decompression Dive

Go across to the find time spent out (2:40) of the water since your last dive. Your time is found between the upper and lower number.



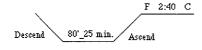
6. Go down the column to find your new Group Designation C.



You have now calculated your **Group Designation** for one **No-Decompression Dive**. For a complete listing of the dive tables see Appendix A and B.

Linear Representation

Shows all aspects of a the dive profile including depth, bottom time, surfacing group designation, surface interval time, and final group designation.



Repetitive No-Decompression Dive

Planning A Repetitive No-Decompression Dive

For this example of a Repetitive No-Decompression dive we will continue the dive profile we have been using.

Recap of Last Dive

- 1. Maximum Depth was 80 feet.
- 2. Bottom Time was 25 minutes.
- 3. We calculated that we entered into the F Group Designation after dive.
- 4. Surface Interval Time was 2:40.
- 5. We calculated that we entered into the C Group Designation after the surface interval.

Dive	Depth	Bottom Time	Surface Time	Group Designation
1st	80	00:25 /F	2:40	С
2nd				
3rd				

1st Repetitive Dive

We left our last position in the dive tables at the Group Designation for a Repetitive Dive. Our designation was C. We now would like to dive to a depth of 70 ft.. How long can we stay at that depth without having to decompress?

■ Di	ve Lo	g 🗏							
1:53	2:18	2:47	3:22	4:04	5:03	6:32	9:43	12:00	K
1:44	2:05	2:30	3:00	3:34	4:18	5:17	6:45	9:55	П
2:04	2:29	2:59	3:33	4:17	5:16	6:44	9:54	12:00	
1:56	2:18	2:43	3:11	3:46	4:30	5:28	6:57	10:0€	
2:17	2:42	3:10	3:45	4:29	5:27	6:56	10:05	12:00	l
1	Н	G	F		Ð	C	В	Α	
•	•••	•	•	_	-		-	••	l

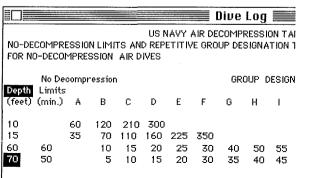
To find out we need to calculate our $\bf Risidual\ Nitrogen\ Time$ from the previous dive.

Repetitive No-Decompression Dive

- Move down to the left of the table to the Repetitive Dive Depth heading. Choose the depth you wish to descend to. For this example we will use 70 ft.
- Move across to the column that has your previous Group
 Designation C. The number you have reached should be 15.
 This number is your Residual Nitrogen Time. This is the time
 a diver is to consider he has already spent on the bottom when
 he starts a repetitive dive.

							■ Di	ve Lo	g 🗏						
	.,	0:24	0:39	0:54	1:11	1:30	1:53	2:18	2:47	3:22	4:04	5:03	6:32	9:43	12:00
0	0:10	0:24	0:37	0:52	1:08	1:25	1:44	2:05	2:30	3:00	3:34	4:18	5:17	6:45	9:55
l	0:23	0:36	0:51	1:07	1:24	1:43	2:04	2:29	2:59	3:33	4:17	5:16	6:44	9:54	12:00
0:10	0:23	0:35	0:49	1:03	1:19	1:37	1:56	2:18	2:43	3:11	3:46	4:30	5:28	6:57	10:0€
0:22	0:34	0:48	1:02	1:18	1:36	1:55	2:17	2:42	3:10	3:45	4:29	5:27	6:56	10:05	12:00
	0	N	M	L	K	J	1	Н	G	F	£	D	С	В	A
REPE"	TITIVE												_		
DIVE															-
Depth	0	N	М	L	K	ل	I	Н	G	F	Ε	D	С	В	A
(feet)	l														
40	241	213	187	161	138	116	101	87	73	61	49	37	25	17	7
50	160	142	124	111	99	87	76	66	56	47	38	29	21	13	6
60	117	107	97	88	79	70	61	52	44	36	30	24	17	11	5
70	96	87	80	72	64	57	50	43	37	31	26	20	15	9	4
80	20	フス	68	61	54	42	43	32	ス ク	28	つて	18	13	8	ایما

3. Move up to the top left of the table to the **Depth** column and find the 70 ft. depth.



Repetitive No-Decompression Dive

4. Move right to the next column "No Decompression Limits". The number you have reached should be 50. This is the time in minutes you may stay at 70 ft. without having to do a decompression stop.

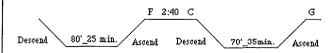
)ive	Log		
	US NAVY AIR DECOMPRESSION TAI NO-DECOMPRESSION LIMITS AND REPETITIVE GROUP DESIGNATION 1 FOR NO-DECOMPRESSION AIR DIVES										
	No De Limits (min.)	_	ressior B	c c	Đ	E	F	GR(OUP D	ESIGN I	
10 15		60 35	120 70	210 110	300 160	225	350				
60 70	60 50		10 5	15 10	20 15	25 20	30 30	40 35	50 40	55 45	

5. You must now subtract your Residual Nitrogen Time of 15 minutes from the No Decompression Limit Time of 50 minutes (the Calculator DA may be used if you like). Your No Decompression Limit now becomes 35 minutes as a result of the nitrogen left in your body from the previous dive.

1	60	60	10	15	20	25	30	40	50	55
ĺ	60 70	50	5	10	15	20	30	35	40	45

6. If you dive to 70 ft. and your Bottom Time is 35 min. your Group Designation will be G. You may now continue through the tables starting at Step 2 of a No-Decompression Dive on page 25 of this manual.

Linear Representation of The Two Dives



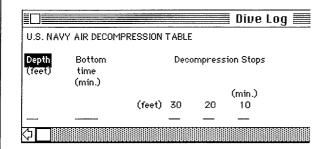
Repetitive Decompression Dive

We do not encourage Decompression dives for sport divers but the ability to calculate the decompression stops using the dive tables could just save your life in an emergency situation. For this example of a Repetitive Decompression dive we will continue the dive profile we have been using (see "Recap Of Last Dive" page 27).

Decompression Repetitive Dive Profile

After the Surface Interval from the first No-Decompression dive the divers Group Designation was C. The diver has again descended to the 70 ft. depth on his first repetitive dive. His Bottom Time has been 50 min. with a Residual Nitrogen Time of 15 min. from his previous dive. So his Total Bottom Time is 65 min. which exceedes the 50 min. No-Decompression Limit for 70 ft.. How does the diver calculate his decompression stops?

1. Go to the Dive Decompression Tables and locate the Depth column on the left side of the table.



2. Follow this column down until you reach the 70 ft, mark.

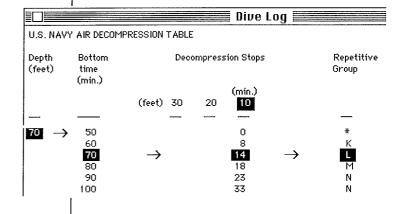
	Dive Log	
70 50		0
60		8
70		14
80		18
90		23
100		33

Repetitive Decompression Dive

 Locate 70 in the next column across with the heading "Bottom Time". The divers Bottom Time was only 65 min, but we must advance to the next greater value of 70 because 65 does not exist on the dive table.

		📱 Dive Log		
70	50		0	×
- →	60		8	K
-	70		14	L
	80		18	M
	90		23	N
	100		33	N
	110	2	41	0
	120	4	47	0

4. Continue across the table until you encounter the number 14. At this depth it will be 14 minutes under the 10 ft. column. So the diver must make one 14 min. decompression stop at 10 ft.



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5. Move across one more column to the Repetetitive Group heading (as shown above) to find the new Group Designation. The new designation will be L after the decompression stop has been made.

Diver Tip

30

Always select the exact or next greater Bottom Time in the dive tables.

Repetitive Decompression Dive

Linear Representation Of Repetitive Decompression Dive

To clearly understand the decompression dive refer to Figure 1. You will notice the decompression stop added during the final ascent. To further demonstrate the dive tables we have added a third dive to Figure 2. On the right side of the Figure 2 you will notice that we have added three depths on the third dive. These are the No-Decompression Limits for these depths for a group E Diver. We have also added the Group Designation for the diver returning from these different depths.

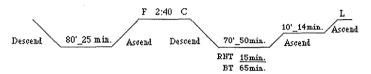


Figure 1

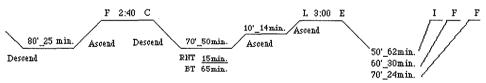


Figure 2

Divers Tip

Decompression Dive: A decompression dive is calculated the same way as a **Repetitive Decompression Dive** only your beginning group designation will be **A**.

To learn further about the dive tables and decompression tables please go to your local dive shop and become a certified diver or just purchase the basic dive manual from one of the certifying agencies. The information contained in these books will further help you while diving with MacScuba.

APPENDIX



JE AVY AIR NO-DECOMPRESSION TABLE

NO-DECOMPRESSION LIMITS AND REPETITIVE GROUP DESIGNATION TABLE FOR NO-DECOMPRESSION AIR DIVES

No Decompression										GROUP DESIGNATION						
	Depth Limits												_			_
(feet) (min.) A	В	С	D	F.	F	G	Н	I	J	K	L	M	N	O
				2.0	200											
10		60	120	210	300											
15		35	70	110	160	225	350									
20		25	50	75	100	135	180	240	325							
25		20	35	55	75	100	125	160	195	245	315					
30		15	30	45	60	75	95	120	145	170	205	250	310			
35	310	5	15	25	40	50	60	80	100	120	140	160	190	220	270	310
40	200	5	15	20	30	40	50	60	70	80	100	110	130	150	170	200
50	100		10	15	25	30	40	50	60	70	80	90	100			
60	60		10	15	20	25	30	40	50	55	60	, ,				
	50		5	10	15	20	30	35	40	45	50					
70	50		,	10	13	20	50	33	40	43	50					
90	40		-	10	15	20	25	30	35	40						
80	40		5													
90	30		5	10	12	15	20	25	30							
100	25		5	7	10	15	20	22	25							
110	20			5	10	13	15	20								
120	15			5	10	12	15									

	REPETITIVE GROUP AT THE BEGINNING OF SURFACE INTERVAL															
															A	0:10
																12:00
														В	0:10	2:11
															2:10	12:00
													C	0:10	1:40	2:50
														1:39	2:49	12:00
												D	0:10	1:10	2:39	5:49
													1:09	2:38	5:48	12:00
											E	0:10	0:55	1:58	3:23	6:33
												0:54	1:57	3:22		12:00
										F	0:10	0:46	1:30	2:29	3:58	7:06
										•	0:45	1:29	2:28	3:57	7:05	2:00
									G	0:10	0:41	1:16	2:00	2:59	4:26	7:36
									Ü	0:40	1:15	1:59	2:58	4:25		12:00
								Н	0:10	0:37	1:07	1:42	2:24	3:21	4:50	8:00
								11	0:36	1:06	1:41	2:23	3:20	4:49		12:00
							I	0:10		1:00	1:30	2:03	2:45	3:44	5:13	8:22
							1	0:33	0:59	1:29	2:02	2:44	3:43	5:12		12:00
						J	0:10		0:55	1:20	1:48	2:21	3:05	4:03	5:41	8:41
						J	0:10		1:19	1:47	2:20	3:04	4:02	5:40		12:00
					17	0.10				1:36	2:04	2:39	3:22	4:20	5:49	8:59
					K	0:10 0:28	0:29		1:12	2:03	2:38	3:21	4:19	5:48		12:00
										1:50	2:38	2:54	3:37	4:36	6:03	9:13
				L	0:10		0:46		1:26							
					0:26		1:04		1:49	2:19	2:53	3:36	4:35	6:02		12:00
			M	0:10			1:00		1:40	2:06	2:35	3:09	3:53	4:50	6:19	9:29
				0:25			1:18		2:05	2:34	3:08	3:52	4:49	6:18		12:00
		N	0:10	0:25			1:12		1:54	2:19	2:48	3:23	4:05	5:04	6:33	9:44
			0:24	0:39			1:30		2:18	2:47	3:22	4:04	5:03	6:32		12:00
	O	0:10	0:24	0:37			1:25		2:05	2:30	3:00	3:34		5:17	6:45	9:55
		0:23	0:36	0:51			1:43		2:29	2:59	3:33	4:17	5:16	6:44		12:00
		0:23	0:35	0:49			1:37		2:18	2:43	3:11	3:46	4:30	5:28		10:06
	0:22	0:34	0:48	1:02			1:55		2:42		3:45	4:29	5:27		10:05	
		O	N	M	L	K	J	I	Н	G	F	E	D	C	В	Α
REPET	ITIVE	;														
DIVE		_				17	,	I		G	F	Е	Ι		С Б	3 A
Depth		О	N	M	L	K	J	1	Н	U	Γ	E	1.	, ,	- L	, A
(feet)	0.55		212	105	1.61	120		. 10	. 07			1 4	0 2	7 2	5 1	7 7
40	257	241	213	187												
50	169	160	142	124		99	87			56						
60	122	117	107	97	88	79	70			44	_					
70	100	96	87	80	72	64	57			37						
80	84	73	68	61	54	48	43			28					3 4	
90	73	70	64	58	53	47	43			29						-
100	64	62	57	52	48	43	38			26						
110	57	55	51	47	42	38	34			24						
120	52	50	46	43	39	35	32			21				۷ !) (5 3
					D1	rcini	IAT. N	UITRA	CEN	TIM	ES IM	INIT	TOST .			

RESIDUAL NITROGEN TIMES (MINUTES) Appendix A 35

J.S. Navy Decompression Table

Depth (feet)	Bottom Time	De	compre	ssion Sto	ps	Repetitive Group
(icci)	(min)	40	30	20	10	•
40	200				0	*
	210				2	N
	230				7 /	N
	250				H	О
	270				15	О
	300				19	Z
50	100				0	*
	110				3	L
	120				5	M
	140				10	M
	160				21	N
	180				29	О
	200				35	О
	220				40	Z
	240				47	Z
60	60				0	*
	70				2	K
	80				7	L
	100				14	M
	120				26	N
	140				39	О
	160				48	Z
	180			1	56	Z
	200					
70	50				0	*
	60				8	K
	70				14	L
	80				18	M
	90				23	Ν
	100				33	N
	110			2	41	О
	120			4	47	О
80	40				0	*
	50				10	ĸ
	60				17	L
	70				23	M
	80			2	31	N
	90			7	39	0
	100			11	46	O
	110			13	53	Z
	120			17	56	Z

U.S. Navy Decompression Table

Donallo	Bottom	Dog	•	on Stops		Repetitive
Depth		Dece	mpi essi	on stops		Group
(feet)	Time (min)	40	30	20	10	Group
90	30				0	*
	40				7	J
	50				18	L
	60				25	M
	70			7	30	N
	80			13	40	N
	90			18	48	0
	100			21	54	Z
	110			24	61	Z
	120			32	68	Z
100	25				0	*
	30				3	I
	40				15	K
	50			2	24	L
	60			9	28	M
	70			17	39	N
	80			23	48	О
	90		3	23	57	O
	100		7	23	66	Z
	110		10	34	72	Z
	120		12	41	78	Z
110	20				0	*
	25				3	Н
	30				7	J
	40			2	21	L
	50			8	26	M
	60			18	36	N
	70		1	23	48	О
	80		7	23	57	Z
	90		12	30	64	Z
	100		15	37	72	Z
120	15				0	*
	20				2	H
	25				6	I
	30				14	J
	40			5	25	L
	50			15	31	M
	60		2	22	45	N
	70		9	23	55	0
	80		15	27	63	0
	90		19	37	74	Z
	100		23	45	80	Z

Glossary

Buoyancy Control Device (B.C.D.) - Jacket or collar worn by a diver to maintain neutral buoyancy.

Bottom Time - The total time in minutes a diver spends underwater from the beginning of descent until the beginning of ascent.

C-Card - Certification card from one of the certifying agencies that allows a diver to refill his or her tanks at any dive shop and shows they have successfully completed the requirments to become a scuba diver.

Decompression - To relieve a diver of the nitrogen saturation in the body.

Decompression Stop - The time a diver spends at a specified depth during ascent.

Dive Log - The book that a diver records information from all of his dives.

Neutral Buoyancy - The ability to maintain a stable depth underwater.

No-Decompression Limit - The total time a diver may spend at a certain depth without decompression being required.

P.S.I - Pounds per Square Inch

Repetetive Dive - A dive made between 10 minutes and 12 hours of a previous dive.

Residual Nitrogen - The nitrogen gas remaining in a divers body after a dive.

Residual Nitrogen Time - (RNT) The amount of time in minutes, added to a divers bottom time of a repetitive dive to represent the Risidual Nitrogen from a previous dive. The amount can be obtained from the Navy dive tables by using the Group Designation letter.

Scuba - Self Contained Underwater Breathing Apparatus

Skin Diver - Also called a "Free Diver". Person who descends beneath the water while holding his or her breath for a prolonged period of time.

Surface Interval - Time a diver has spent between dives at the surface.

Total Bottom Time - The sum of the Risidual Nitrogen and the Bottom Time of a dive. This is used to determine the group designation of a diver after a repetetive dive.

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Hints, Tips, and Solutions

Version 1.02c

some of these suggestions assume that you are familiar with the operation of MacScuba and it's dive manual. It further assumes that you are familiar with the Macintosh operating system, if you are not, please review the operation manuals for the Macintosh computer and the MacScuba dive simulator.

Hints

Finding The Entrance To The Ship.

- 1. Go directly to the bottom at 100 ft., do not turn right or left while descending. You should now be looking directly at the bow (front) of the ship.
- 2. Turn left to a compass heading of 270 degrees.
- 3. Swim forward 1 click of the scuba fins.
- 4. Turn right to a compass heading of 0 degrees.
- 5. Swim forward 1 click of the scuba fins.
- 6. Turn right to a compass heading of 90 degrees. The ship should come into view, positioned with the bow on your right and the stern (rear of ship) on your left.
- 7. Swim forward 1 click of the scuba fins, and be sure to turn on your dive light when you enter the ship.

Tips

Using The Dive Tables

When you select the dive tables under the "Scuba" menu, try these tips.

- 1. Under the "Style" menu, choose "Underline', it will make reading the dive tables easier.
- 2. When moving across the tables, click mouse to invert the selection and drag across the page.
- 3. Do the same as tip 2, when moving up the tables.

Solutions

Problem: Program keeps asking for Disk #2 "The Sea", when installed on a hard-disk.

1. Be sure you have copied the **CONTENTS** of the folder "The Sea" into the "Treasure" folder on your hard-disk. The tank icons from "The Sea" should be with the "Treasure" tank icons.

Problem: If you are getting System Error 25 (Can't allocate requested memory block in the heap), try the solutions listed below.

Mac Plus, SE, and Mac II:

- 1. If you have additional Fonts loaded into your system, you may have to remove some of them to release more memory for MacScuba to run properly (use the "Font DA Mover" utility).
- 2. Be sure MultiFinder is not active.
- 3. Make sure the RAM Cache is set to "off".
- 4. Make sure that you are not running too many background programs in the system, such as Macro Maker or Close View, from sytem version 6.0.2.

Mac II Only

Be sure you are in the black & white mode only, this can be changed in the "Monitor" control panel CDEV MacScuba is not available in color at this time, if you will send in your registration card we will inform you of any new versions that become available with color.

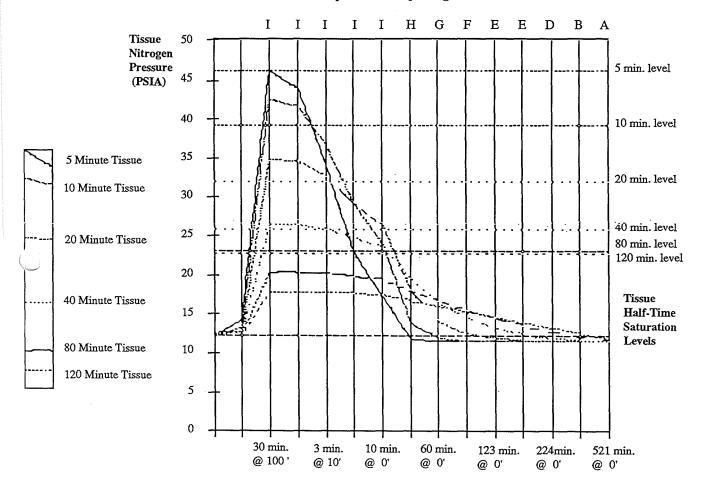
MacScuba Technical Support: (602) 893-8324

MacScuba Dive Simulator

Decompression Dive Profile

A typical decompression dive using the Macuba dive simulator 's decompression formulas. The formulas are based on the work of English physiologist, J.S. Haldane. The graph represents a divers nitrogen tissue saturation for a dive to 100 feet for 30 minutes, with a 3 minute @ 10' decompression stop and 5 surface time intervals following the dive. This graph shows the relationship between the U.S. Navy dive tables and a divers nitrogen intake while diving. It has been provided to show the accuracy the MacScuba dive simulator achieve's when calculating the nitrogen content of a divers body.

Repetitive Group Designation



The tissue curves should be below their corresponding tissue half-time saturation levels to allow the diver to surface without fear of nitrogen bubble formation in the blood stream, resulting in decompression sickness, or what is commonly called "the Bends". The critical tissue on this dive being the 20 minute tissue. If the 3 minute @ 10' decompression stop had not been done, the tissue would have remained above the saturation level, and possibly resulted in the diver acquiring the bends.